

# The association between body mass index and patients' experiences with inpatient care

I. PEYTREMANN-BRIDEVAUX<sup>1</sup>, V. KOLLY<sup>2,†</sup> AND T.V. PERNEGER<sup>3,†</sup>

<sup>1</sup>Institute of Social and Preventive Medicine, Centre Hospitalier Vaudois and University of Lausanne, Bugnon 17 CH-1005 Lausanne, Switzerland, <sup>2</sup>University Hospitals of Geneva, Geneva, Switzerland, and <sup>3</sup>Division of Clinical Epidemiology, University Hospitals of Geneva and University of Geneva, Geneva, Switzerland

Address reprint requests to: I. Peytremann-Bridevaux, Tel: : +41-21-314-72-84; Fax: +41-21-314-73-73; E-mail: isabelle.peytremann-bridevaux@chuv.ch

Accepted for publication 2 January 2010

---

## Abstract

**Objective.** To explore the association between patients' body mass index (BMI) and their experiences with inpatient care.

**Design.** Cross-sectional. Mail survey.

**Setting.** University Hospital of Geneva.

**Participants.** Questionnaires were mailed to 2385 eligible adult patients, 6 weeks after discharge (response rate = 69%).

**Main Outcome Measures.** Patients' experiences with care were measured using the Picker inpatient survey questionnaire. BMI was calculated using self-reported height and weight. Main dependent variables were the global Picker patient experience (PPE-15) score and nine dimension-specific problem scores, scored from 0 (no reported problems) to 1 (all items coded as problems). We used linear regressions, adjusting for age, gender, education, subjective health, smoking and hospitalization, to assess the association between patients' BMI and their experiences with inpatient care.

**Results.** Of the patients, 4.8% were underweight, 50.8% had normal weight, 30.3% were overweight and 14.1% were obese. Adjusted analysis shows that compared with normal weight, obesity was significantly associated with fewer problematic items in the surgery-related information domain, and being underweight or overweight was associated with more problematic items in the involvement of family/friends domain. The global PPE-15 score was significantly higher (more problems) for underweight patients.

**Conclusions.** Underweight patients, but not obese patients, reported more problems during hospitalization.

**Keywords:** obesity, quality of care, patients' experiences, satisfaction, survey

---

## Introduction

In recent years, the prevalence of overweight and obesity has been increasing [1]. Obesity is associated with increased morbidity and mortality [2], as well as with higher health-care utilization and costs [3]. In addition, since obese individuals show physical embarrassment and low self-esteem [4], and physicians may hold negative attitudes towards obese patients [5], the quality of care for overweight and obese patients might be suboptimal.

Current medical practice often lags behind recommended care [6], but whether obesity is an additional risk factor for poor care remains unclear. Several recent studies have

examined the association between body mass index (BMI) and receipt of preventive services [7–9]. Although most have shown that screening procedures such as cervical, breast and colorectal cancer screening, as well as influenza immunization, are less often offered to obese individuals, compared with normal weight individuals [7, 9], this finding is not universal [8]. Other studies have evaluated how satisfaction and/or patients' experiences with care varies according to BMI. Many reported similar or even higher levels of satisfaction with increasing BMI [10–13], whereas others found patients with higher BMI to be less satisfied with outpatient care [14]. Whether BMI is associated with patients' experiences or satisfaction with inpatient care remains unknown.

<sup>†</sup>At the time of the study, T.V.P. and V.K. were with the Quality of Care Service, University Hospitals of Geneva.

To clarify this issue, we examined the relationship between patients' BMI and their report of problems during hospitalization. We hypothesized that overweight and obese inpatients would report more problems than normal weight patients.

## Methods

### Data source and participants

From April to August 2007, we surveyed patients discharged from the University Hospital of Geneva between 15 February and 15 March 2007. All inpatients aged 18 years and over who had been hospitalized for more than 24 h were included in the study. Patients staying in prison, residing outside Switzerland, deceased during hospitalization or transferred to another hospital during that stay were excluded. Secondary exclusions, defined *a priori*, were carried out during data collection (patients who considered themselves or were considered by their proxies to be too sick to complete a questionnaire, who had died after discharge, who did not understand French or whose address was invalid). The first survey package, mailed within 6 weeks of hospital discharge, comprised a cover letter, the questionnaire and a stamped return envelop. Up to two reminder mailings including a full survey package were sent to non-respondents 4 and 8 weeks later, if no reply was received in-between.

Out of 2686 eligible patients, 1654 returned a questionnaire (response rate: 69.2%). After exclusion of 19 patients who returned only partially filled questionnaires and 113 patients because of missing BMI, the analysis sample consisted of 1522 patients.

As for all patient satisfaction surveys conducted on a regular basis, this project was exempted from full review by the research ethics committee of the Geneva University Hospitals.

### Measurements

*Patients' experiences and satisfaction questionnaire.* Our main outcome of interest was patients' experiences with inpatient care, measured using the Picker institute inpatient questionnaire [15], a 50-item questionnaire mainly including report items (what happened or did not happen) and divided into nine sections representing nine core dimensions (problem scores): emotional support, respect for patients' preferences, involvement of family and/or friends, information and education, physical comfort, continuity of care, coordination of care, surgery-related information and general impression. The global 15-item score (Picker patient experience questionnaire, PPE-15) was also computed [16]. First, each item was coded as a 'problem score' indicating either the presence or absence of a problem. Then, each domain score and the global score were scored from 0 (no reported problems) to 100 (all items reported as problems).

Two other single-item outcomes considered in our analysis were an overall satisfaction rating (excellent/very good/good versus fair/poor) and the patients' willingness to recommend

the hospital to others (yes certainly or yes probably versus no).

*Body mass index.* Height and weight were self-reported, and BMI was calculated as the weight in kilograms divided by the squared height in metres ( $\text{kg/m}^2$ ). Individuals were classified as underweight ( $\text{BMI} < 18.5 \text{ kg/m}^2$ ), normal ( $\text{BMI} = 18.5\text{--}24.9 \text{ kg/m}^2$ ), overweight ( $\text{BMI} = 25\text{--}29.9 \text{ kg/m}^2$ ) or obese ( $\text{BMI} \geq 30 \text{ kg/m}^2$ ).

*Other variables.* Age and gender were recorded from administrative charts, and the following patients' characteristics were collected using the questionnaire: education (elementary school, apprenticeship, high school and university), subjective health (excellent, very good, good, fair and poor), current smoking (yes/no) and previous hospitalization in the past 6 months ( $\geq 1$  versus 0).

### Statistical analysis

To compare the patients' characteristics across BMI groups, we first used  $\chi^2$  tests for categorical variables and one-way ANOVA for continuous variables. Then, we performed crude and adjusted analyses using (i) linear regression to examine the association between BMI and each of the nine problem scores and the global PPE-15 score, and (ii) logistic regression to examine the association between BMI and the overall satisfaction rating, as well as between BMI and hospital recommendation to others. The 'normal weight' category was taken as the reference, and adjustment for age, gender, education, subjective health, tobacco use and previous hospitalization during past 6 months was considered. In all analysis,  $P < 0.05$  was considered significant.

## Results

Patients with missing BMI ( $n = 113$ ) were older (64.1 versus 55.6 years,  $P < 0.01$ ) than those with non-missing BMI ( $n = 1522$ ), but the two groups were similar in terms of gender, education, smoking status, subjective health and hospital use.

Among the 1522 participants, the mean age was 55.6 years (SD 19.3), 58% were women, and 24.1% were current smokers. Other characteristics appear in Table 1.

In non-adjusted analysis (Table 2), compared with normal weight patients, overweight patients reported more problems (less satisfaction with inpatient care) in the 'involvement of family and/or friends' domain, and underweight patients reported significantly more problems in the 'involvement of family and/or friends', the 'information and education' and 'physical comfort' domains. Obese individuals presented significantly fewer problems in the 'surgery-related information' domain. After adjustment for potential confounders (Table 3), significant differences remained for obese (less problems in the 'surgery-related information' domain) as well as for under- and overweight patients (more problems in the 'involvement of family and/or friends' domain), compared with normal weight patients. Underweight patients had significantly higher (worse) PPE-15 scores than other groups (Table 3).

**Table 1** Characteristics of included patients, by BMI category

	All patients ( <i>n</i> = 1522)	Underweight (BMI < 18.5 kg/ m <sup>2</sup> ) ( <i>n</i> = 73)	Normal weight (BMI = 18.5– 24.9 kg/m <sup>2</sup> ) ( <i>n</i> = 773)	Overweight (BMI = 25.0– 29.9 kg/m <sup>2</sup> ) ( <i>n</i> = 461)	Obesity (BMI ≥ 30.0 kg/ m <sup>2</sup> ) ( <i>n</i> = 215)	<i>P</i> -value*
Age, mean (SD) ( <i>n</i> = 1518)	55.6 (19.3)	55.7 (22.3)	52.8 (20.2)	59.5 (17.6)	57.5 (16.5)	<0.001
Women ( <i>n</i> = 1518)	58%	74%	63.1%	45.9%	60.6%	<0.001
Education ( <i>n</i> = 1481)						
Elementary school	27.6%	26.9%	20.9%	33.8%	38.9%	<0.001
Apprenticeship	31.9%	28.4%	32.4%	33.3%	28.4%	
High school	8.5%	7.5%	10.1%	7.7%	4.7%	
University	32%	37.3%	36.5%	25.1%	27.9%	
Subjective health ( <i>n</i> = 1495)						
Excellent/very good	24.4%	17.4%	29.6%	22.8%	12.2%	<0.001
Good	48%	36.2%	47.7%	51.3%	45.5%	
Fair/poor	27.5%	46.4%	22.7%	25.9%	42.3%	
Current smoking ( <i>n</i> = 1389)	24.1%	37.3%	26.2%	22.8%	14.5%	<0.001
Hospitalization past 6 months	29.9%	43.9%	29.5%	32.3%	21.2%	0.002

\**P*-value of  $\chi^2$  test or one-way ANOVA (homogeneity across BMI categories).

**Table 2** Unadjusted means of the nine problem scores (domains) of the Picker satisfaction instrument, and the PPE-15 summary score, by BMI category

Problem score (domain)	Underweight (BMI < 18.5 kg/m <sup>2</sup> )	Normal weight (BMI = 18.5– 24.9 kg/m <sup>2</sup> )	Overweight (BMI = 25.0– 29.9 kg/m <sup>2</sup> )	Obesity (BMI ≥ 30.0 kg/m <sup>2</sup> )	<i>P</i> -value <sup>a</sup>
Emotional support	39.7	34.1	33.6	32.2	0.39
Respect patients' preferences	34.2	29.7	29.5	31.5	0.44
Involvement of family/friends	31.0	23.5	28.5	27.0	0.02*
Information and education	36.4	29.0	28.1	28.9	0.17
Physical comfort	25.5	18.2	18.1	19.4	0.13
Continuity of care (discharge)	38.4	34.7	37.8	35.9	0.38
Care coordination	31.3	28.4	25.5	27.3	0.14
Surgery-related information	38.5	35.0	31.4	25.6	0.03*
General impression	14.2	10.4	9.4	9.2	0.15
PPE-15	36.7	29.5	30.2	30.7	0.09

PPE-15, overall problem score of the 15-item Picker patient experience questionnaire.

<sup>a</sup>*P*-value of the *F*-statistic.

\*Statistically significant (*P* < 0.05).

In adjusted analysis, BMI was neither associated with the overall satisfaction rating [underweight: odds ratio (OR) 0.6, 95% confidence interval (CI) 0.2–1.4; overweight: OR 0.7, 95% CI 0.4–1.3; and obesity: OR 2.4, 95% CI 0.9–6.5] nor to the willingness to recommend the hospital to others (underweight: OR 0.6, 95% CI 0.3–1.3; overweight: OR 0.9, 95% CI 0.5–1.4; and obesity: OR 1.2, 95% CI 0.6–2.3).

## Discussion

The results of this study do not support our hypothesis and suggest that obesity is not associated with negative inpatient experiences and lower levels of satisfaction with care. On the other hand, underweight patients reported significantly more

**Table 3** Adjusted<sup>a</sup> means of the nine problem scores (domains) of the Picker satisfaction instrument, and the PPE-15 summary score, by BMI category

Problem score (domain)	Underweight (BMI < 18.5 kg/m <sup>2</sup> )		Normal weight (BMI = 18.5–24.9 kg/m <sup>2</sup> )		Overweight (BMI = 25.0–29.9 kg/m <sup>2</sup> )		Obesity (BMI ≥ 30.0 kg/m <sup>2</sup> )	
	Mean	P-value <sup>†</sup>	Mean	P-value <sup>†</sup>	Mean	P-value <sup>†</sup>	Mean	P-value <sup>†</sup>
Emotional support	39.2	0.31	34.6	Ref.	35.2	0.78	31.9	0.30
Respect for patients' preferences	31.6	0.76	30.4	Ref.	29.8	0.72	31.2	0.73
Involvement of family/friends	33.4	0.04*	24.2	Ref.	29.6	0.01*	28.0	0.16
Information and education	34.6	0.27	30.3	Ref.	29.0	0.51	28.9	0.59
Physical comfort	24.7	0.12	18.8	Ref.	19.1	0.82	18.8	0.94
Continuity of care (discharge)	41.8	0.17	35.8	Ref.	38.6	0.20	36.8	0.71
Coordination of care	27.8	0.69	29.1	Ref.	27.6	0.41	28.7	0.82
Surgery-related information	40.6	0.46	36.1	Ref.	33.7	0.42	25.7	<0.01*
General impression	15.0	0.08	10.7	Ref.	10.9	0.84	8.7	0.19
PPE-15	36.8	0.03*	30.4	Ref.	31.4	0.43	30.9	0.15

PPE-15, overall problem score of the 15-item Picker patient experience questionnaire.

<sup>a</sup>Adjusted for age, gender, education, subjective health, smoking, previous hospitalization in past 6 months.

\*Statistically significant ( $P < 0.05$ ).

<sup>†</sup>P-value comparing the specific BMI category to normal weight patients (reference).

problems (less satisfaction) in the global PPE-15 score and the involvement of family/friends domain.

One reason for finding no differences between inpatient care experiences of non-obese and obese patients could be the lack of sensitivity of the instruments to these types of comparisons. Despite the fact that other authors assessing patients' experiences and/or satisfaction with ambulatory care in diverse health-care contexts found similar results, it remains difficult to compare results. Indeed, even though other studies mostly targeted outpatients from US academic settings, measures of satisfaction varied greatly and did not always use validated instruments assessing patients' experiences (they rather considered satisfaction rating). Alternatively, obese patients do experience some form of discrimination during their health-care episode that common patient opinion instruments fail to capture. Another reason could be that discrimination against obese patients is accepted by these as a fact of life and does not influence their satisfaction and experience with care.

We did not expect to find significantly more problems among underweight patients, even after adjustment for age, gender, health status and previous hospitalizations during the past 6 months. We believe that the most likely interpretation is that many underweight patients suffer from severe chronic diseases, and that it is their poor health and the nature of the health care they receive that explains their higher report of problems during hospitalization, not their underweight status *per se*. These findings require confirmation in other studies.

Some limitations must be considered. First, self-reported height and weight underestimates the true prevalence of overweight and obesity [17] and may overestimates the associations between BMI and health outcomes [18]. However, since obese patients were not found to be

statistically less satisfied than normal weight patients, this should not affect our conclusions. Also, we are not sure how BMI reported 6 weeks after discharge reflects usual (true) BMI and how this might have modified the BMI–patients' experiences/satisfaction association. Second, the response rate was moderate, so that selection bias cannot be excluded. Finally, the sample size could have prevented the detection of true differences between subgroups.

Obese patients did not report more problems and lower satisfaction with hospital care than normal weight patients. Since patients' experiences and satisfaction with care represent only one of several indicators of quality of care, health-care professionals should continue to provide appropriate and high-quality care to their patients, irrespective of weight. To better understand how BMI is associated with patients' experiences and satisfaction of care, future studies should reassess this question in both in- and outpatients of various countries, always compare results to non-obese patients and use validated instruments. Using qualitative methods to explore experiences of obese patients may also shed light on this issue.

## Acknowledgements

The patient survey was conducted by the Quality of Care Unit, University Hospitals of Geneva.

## Funding

I.P.-B. was supported by a grant from the 'Bourse de la commission pour la promotion académique des femmes, Faculté de biologie et médecine de l'Université de Lausanne'.

## References

1. Ogden CL, Carroll MD, Curtin LR *et al*. Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA* 2006;**295**:1549–55.
2. Overweight obesity health risk. National Task Force on the Prevention and Treatment of Obesity. *Arch Intern Med* 2000;**160**:898–904.
3. Peytremann-Bridevaux I, Santos-Eggimann B. Healthcare utilization of overweight and obese Europeans aged 50-y: results from the Study of Health, Ageing and Retirement in Europe (SHARE). *J Public Health (Heidelberg)* 2007;**15**:377–85.
4. Schwartz MB, Vartanian LR, Nosek BA *et al*. The influence of one's own body weight on implicit and explicit anti-fat bias. *Obesity (Silver Spring)* 2006;**14**:440–7.
5. Schwartz MB, Chambliss HO, Brownell KD *et al*. Weight bias among health professionals specializing in obesity. *Obes Res* 2003;**11**:1033–9.
6. McGlynn EA, Asch SM, Adams J *et al*. The quality of health care delivered to adults in the United States. *N Engl J Med* 2003;**348**:2635–45.
7. Fontaine KR, Faith MS, Allison DB *et al*. Body weight and health care among women in the general population. *Arch Fam Med* 1998;**7**:381–4.
8. Peytremann-Bridevaux I, Santos-Eggimann B. Use of preventive services of overweight and obese Europeans aged 50–79 years. *J Gen Intern Med* 2007;**22**:923–9.
9. Wee CC, McCarthy EP, Davis RB *et al*. Screening for cervical and breast cancer: is obesity an unrecognized barrier to preventive care? *Ann Intern Med* 2000;**132**:697–704.
10. Fong RL, Bertakis KD, Franks P. Association between obesity and patient satisfaction. *Obesity (Silver Spring)* 2006;**14**:1402–11.
11. Wadden TA, Anderson DA, Foster GD *et al*. Obese women's perceptions of their physicians' weight management attitudes and practices. *Arch Fam Med* 2000;**9**:854–60.
12. Wee CC, Phillips RS, Cook EF *et al*. Influence of body weight on patients' satisfaction with ambulatory care. *J Gen Intern Med* 2002;**17**:155–9.
13. Bertakis DK, Azari R. The impact of obesity on primary care visits. *Obes Res* 2005;**13**:1615–23.
14. Hebl MR, Xu J, Mason MF. Weighing the care: patients' perceptions of physician care as a function of gender and weight. *Int J Obes Relat Metab Disord* 2003;**27**:269–75.
15. Jenkinson C, Coulter A, Bruster S *et al*. Patients' experiences and satisfaction with health care: results of a questionnaire study of specific aspects of care. *Qual Saf Health Care* 2002;**11**:335–9.
16. Jenkinson C, Coulter A, Bruster S. The Picker Patient Experience Questionnaire: development and validation using data from in-patient surveys in five countries. *Int J Qual Health Care* 2002;**14**:353–8.
17. Gorber SC, Tremblay M, Moher D *et al*. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obes Rev* 2007;**8**:307–26.
18. Chiolerio A, Peytremann-Bridevaux I, Paccaud F. Associations between obesity and health conditions may be overestimated if self-reported body mass index is used. *Obes Rev* 2007;**8**:373–4.